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Accident Bulletin on China Airlines

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In accordance with the Hong Kong Civil Aviation (Investigation of Accidents) Regulations, an Inspector's investigation is in progress to determine the circumstances and causes that relate to the accident on the MD-11 aeroplane of China airlines flight CI 642 at Hong Kong International Airport on August 22, 1999.

A Civil Aviation spokesman today (Friday) said: "The Accident Bulletin contains factual information as determined up to the time of issue and must be regarded as tentative.

"More in-depth investigation and analysis work remain to be done before a conclusion can be drawn on what caused the accident. Based on past experience, the final report is expected to be completed within two years."

"This Bulletin is published for general information," he added.

The following is the content of the full report:-

Chief Inspector of Accidents

Accident investigation Division

Civil Aviation Department

46th Floor

Queensway Government Offices

66 Queensway

Hong Kong

17 September 1999

Accident Bulletin 1/99

Aircraft type :Boeing MD-11

Registration :B-150

Year of manufacture :1992

Number and type of engines :3 Pratt & Whitney 4460 turbofans

Date and time of accident :22 August 1999 at 1844 hours local time (1044 UTC)

Place of accident :Hong Kong International Airport

Nature of Accident :At the time of the accident, Hong Kong International Airport was affected by a severe tropical storm with strong and gusty wind. The aeroplane made a hard landing initially on its right main wheels, its right engine then contacted the runway surface, there was an outbreak of fire and its right wing detached. The aeroplane rolled over and ended up in an inverted position adjacent to the runway.

Type of flight :Scheduled Public Transport

Persons on board :Crew : 15 Passengers : 300

Fatalities :Three

Serious Injuries :Crew : 5 Passengers : 45

Commander's licence :Airline Transport Pilot's Licence

Commander's age :58 years

Commander's experience :17,900 hours (of which 3260 were on type)

Other crew

Flight deck : 1 First Officer

Cabin : 13 Flight Attendants

Source of information :Field Investigation and interviews

CAL 642 Accident - 22 August 1999

All times are in local

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1. Around the time of the accident, Hong Kong was affected by weather associated with severe tropical storm Sam, centred at approximately 50 kilometres northeast of Hong Kong International Airport. The No. 8 Northwest Gale or Storm Signal was hoisted by the Hong Kong Observatory. Warnings of gale force northwesterly winds with gusts exceeding 50 knots, turbulence and thunderstorms issued by the Airport Meteorological Office were effective at the time of the accident.

2. The Hong Kong Observatory's Windshear and Turbulence Warning System gave warnings of moderate turbulence but no windshear alerts at the time of the accident, and there were no reports of windshear from pilots flying into or out of Hong Kong International Airport on

that day. In view of the prevailing meteorological conditions, amongst other aerodrome and weather information, a warning to pilots to expect significant windshear and severe turbulence on the approach and departure was included in the Automatic Terminal Information Service (ATIS) broadcasts prior to and at the time of the accident. During the two hours before the accident, there were four missed approaches and five diversions because of the weather, while twelve aeroplanes landed successfully.

3. China Airlines flight CAL 642 was a scheduled passenger flight from Bangkok to Hong Kong with an estimated time of arrival of 1838 hours (hr). Because of the adverse forecast weather in Hong Kong, extra fuel in addition to that required was carried. This would provide several options to the crew for diversion should the weather in Hong Kong preclude a landing. As a result, the planned aeroplane weight on arrival was very close to the maximum permitted landing weight. The departure and cruise phases of the flight were uneventful and, before commencing descent into Hong Kong, the flight crew obtained the current weather conditions from the Automatic Terminal Information Service (ATIS), i.e. information 'X-Ray', issued at 1806 hr. This included a mean surface wind of 300 degrees at 35 knots and a runway visual range (RVR) of 650 metres in heavy rain. The Commander then briefed the First Officer for an Instrument Landing System (ILS) approach to Runway 25L, for which the Commander would be the handling pilot. He later remarked that he would land subject to a wind check on final approach. The pilots had determined the landing reference speed (Vref) as 152 knots, and selected a target approach speed of 170 knots in view of the expected strong wind and turbulence on final approach.

4. On establishing radio contact with Hong Kong Approach Control, the crew were given radar vectors to intercept the ILS approach to Runway 25L. At 1838 hr, about 14 nautical miles from touchdown, the aeroplane was transferred to Hong Kong Tower which told the crew to continue the approach. At 1841 hr, the crew were given a visibility in the touchdown zone of 1600 metres and a wind direction from 320 degrees at 25 knots, gusting to 33 knots, and the aeroplane was then cleared to land on Runway 25L. The crew advised 'runway in sight' at around 700 feet above touchdown and were given a further wind check of 320 degrees at 28 knots, gusting to 36 knots. The maximum crosswind limit when landing on a wet runway noted in China Airlines Flight Operations Manual is 24 knots and the minimum RVR for an approach to Runway 25L is 550 metres. The MD-11 Aircraft Flight Manual gives a maximum demonstrated crosswind limit of 35 knots.

5. After becoming visual with the runway, the Commander disconnected the autopilot but left the autothrottle system still engaged. The aeroplane then continued to track the extended centreline, but descended and stabilised slightly low on the glideslope. At around 50 feet above the runway, coincident with the reduction of power to flight idle by the autothrottle system and the increase in pitch attitude, the indicated airspeed reduced from 170 knots to 152 knots immediately before touchdown. Although an

attempt was made to flare the aeroplane in a slightly right wing down attitude (less than 4 degrees), the sink rate was maintained and the aeroplane made a hard landing at 1844 hr. Its right main wheels contacted the runway first and the touchdown was made inside the touchdown zone on the runway centreline. The underside of the right engine cowling then impacted the runway and there was an outbreak of fire followed by the detachment of the right wing. The left wing which remained intact then lifted up and the aeroplane commenced a roll and yaw to the right, which could not be corrected, and ended up in an inverted, reversed position on a grass area just to the right of the runway, some 1100 metres from the threshold. The duty Tower Controller activated the crash alarm immediately to call out the Airport Fire Contingent.

6. The rescue vehicles of the Airport Fire Contingent arrived on scene expeditiously. Fire fighting and rescue operations commenced immediately, and the fire on the aeroplane was brought under control within 2 minutes and suppressed within 5 minutes. The fire in the vicinity of the aeroplane was completely extinguished within 15 minutes.

7. Passengers evacuated the aeroplane through various exits which included a large gap in the fuselage at the mid left door, which had been torn open by the impact, as well as through the overwing left door and the forward right door. The first fireman who entered the cabin via the forward right door around 3 minutes after arrival at the scene described that there was smoke and a smell of jet fuel but the fire inside the cabin had extinguished. Firemen wearing breathing apparatus entered the cabin to release passengers who were still strapped in their seats in the inverted position. The search and rescue operation inside the aeroplane was constrained by the narrow space, and the absence of a gangway. Approximately 8 minutes after arrival at the scene, some 200 passengers had been rescued and led to safety at a temporary collection point on the runway. Two passengers rescued from the wreckage were certified dead before arrival at hospital, and one passenger died five days later in the hospital.

8. On completion of the rescue operations, the fuselage was found inverted with severe impact and some fire damage. The crown of the fuselage in contact with the grass area was crushed downward for the entire length.

9. The right wing was fractured between the No. 3 engine nacelle and the right side of fuselage. The right wing structure outboard of the fracture was in one section and was found on a taxiway about 90 metres from the nose of the aeroplane. The left wing remained attached to the fuselage and was found together with the main wreckage. The inboard section of the left wing exhibited evidence of sooting.

10. The right main landing gear had separated from its mount. All four tires remained attached to the truck beam. The left main landing gear remained attached to the wing and fuselage at its attachment points. There was no evidence of any impact or fire damage to the left main landing gear. The centre landing gear fractured at the bottom of

the cylinder near the axle. Its wheel truck with tires was found on the runway near the wreckage. The nose landing gear remained attached to the front section of the fuselage with minimal structural damage.

11. All 3 engines were found at the crash site. The No. 1 engine (i.e. engine mounted on the left wing) remained attached to the pylon structure. The engine and pylon had separated from the left wing at the front and rear pylon mounts. The No. 2 engine (i.e. the centre engine mounted at the back) remained attached to the inlet and engine mounting structure but the whole assembly was detached from the rear fuselage. The No. 3 engine (i.e. engine mounted on the right wing) remained attached to the pylon structure. The whole assembly however was separated from the right wing but remained close to the right wing on the taxiway.

12. The Chief Inspector of Accidents has ordered an Inspector's Investigation into the cause of the accident in accordance with the Hong Kong Civil Aviation (Investigation of Accidents) Regulations. The investigation is being conducted by the Hong Kong Civil Aviation Department with participation of investigators from the National Transportation Safety Board (NTSB) of the USA and Aviation Safety Council of Taiwan. The Air Accidents Investigation Branch (AAIB) of the United Kingdom was requested to assist in the retrieval of data from the Digital Flight Data Recorder (DFDR) and the playback of the Cockpit Voice Recorder (CVR) of the accident aeroplane.

13. The accident investigation team has conducted interviews with the Commander, the First Officer, flight attendants and some of the passengers on CAL 642. The operator has also submitted the passenger, crew and cargo manifests to the investigation team. Meteorological reports and duty officer reports from various units in connection with this accident were obtained. Reports from the Airport Fire Contingent and the Hospital Authority have also been received. The DFDR, CVR, aircraft flight documents and maintenance records were impounded for investigation purposes.

14. On completion of preliminary investigation at the accident site, the aeroplane wreckage was cut into three pieces and removed to the maintenance apron. It was secured and preserved for further investigation. Much work remains to be done to examine the aeroplane systems and controls. Structural parts and components crucial to the investigation had been sent to Boeing and NTSB for detailed examination. Based on past experience, the final report is expected to be completed within two years. However, during the course of the investigation, should safety recommendations be necessary, they will be promulgated to the parties concerned before the report is published.

This Bulletin contains facts relating to the accident as determined up to the time of issue. The information must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

End/Friday, September 17, 1999

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- CS commends frontline staff in aircraft rescue operations (14.09.99)
- CS' speech at reception for aircraft rescue staff (14.09.99)
- Preliminary on-site investigation of aircraft accident completed (25.08.99)
- Flight Data Recorders retrieved (24.08.99)
- Chek Lap Kok wind conditions on August 22 (24.08.99)
- Transcript of CE's media session at PMH (23.08.99)
- FS' transcript (23.08.99)
- Civil aircraft accident - Inspectors' investigation (23.08.99)
- 152 persons discharged following aircraft incident (23.08.99)
- Counselling service for aircraft incident victims (23.08.99)
- CE's statement on air accident (22.08.99)